

Also available at <http://amc-journal.eu>
ISSN 1855-3966 (printed edn.), ISSN 1855-3974 (electronic edn.)
Ars Mathematica Contemporanea Volume 4, Issue 2, Year 2011, Pages 205-243

A new construction of antipodal distance regular covers of complete graphs through the use of Godsil-Hensel matrices

Mikhail Klin, Christian Pech

Abstract

New constructions of regular distance regular antipodal covers (in the sense of Godsil-Hensel) of complete graphs K_n are presented. The main source of these constructions are skew generalized Hadamard matrices. It is described how to produce such a matrix of order n^2 over a group T from an arbitrary given generalized Hadamard matrix of order n over the same group T . Further, a new regular cover of K_{45} on 135 vertices is produced with the aid of a decoration of the alternating group A_6 .

Keywords: Antipodal graph, automorphism group, association scheme, conference matrix, distance regular cover, generalized Hadamard matrix, Godsil-Hensel matrix, group ring, Foster graph, Mathieu group, Payne's doily, resolvable transversal design, Schur multiplier, semiplane, Taylor graph, two-graph, Tutte's 8-cage, Wielandt's 2-closure.

Math. Subj. Class.: 05E30, 05B20, 20B25, 05E18

Math Sci Net: [05E30 \(05B20\)](#)

Nova konstrukcija antipodnih razdaljno-regularnih krovov polnih grafov s pomočjo Godsila-Hensel-ovih matrik

Povzetek

V članku so predstavljene nove konstrukcije regularnih razdaljno regularnih antipodnih krovov (v smislu Godsila-Hensela) nad polnimi grafi K_n . Glavni izvor teh konstrukcij so poševne posplošene Hadamardove matrike. Opisano je, kako lahko dobimo takšno matriko reda n^2 nad grupo T iz poljubne dane posplošene Hadamardove matrike reda n nad isto grupo T . Nadalje je, s pomočjo alternirajoče grupe A_6 , konstruiran nov regularen krov grafa K_{45} s 135 vozlišči.

Ključne besede: Antipodni graf, grupa avtomorfizmov, asociativna shema, konferenčna matrika, razdaljno-regularni krov, posplošena Hadamardova matrika, Godsila-Hensel-ova matrika, grupni kolobar, Fosterjev graf, Mathieu-jeva grupa, rešljiv tranverzalni načrt, Schurov množitelj, semibiravnina, Taylorjev graf, 2-graf, Tutte'jeva 8-kletka, Wielandtovo 2-zaprtje.